A report on Ticks collected from Birds and small Mammals in North Arcot and Chittoor Districts, South India

BY

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Early knowledge about ticks in south India was very scanty and based mainly on collections made by veterinarians on domestic animals. Sharif published a key in 1928 and Sen summarised the existing knowledge about tick ectoparasites of wild mammals and birds in 1938. Subsequently the Virus Research Centre (VRC) has built up a large body of information on the subject based on collections made in several parts of India.

The present report is intended to place on record information on ticks collected from an area mainly in North Arcot District, Madras State, not covered by any of the previous surveys made by the VRC. The extensive studies made by the VRC in another part of south India, Mysore State, are being separately reported by the workers concerned (Trapido *et al.* 1964a and 1964b; Rajagopalan, V. R. C. unpublished data).

Methods

During 1963 birds were mist-netted weekly in each of two villages in North Arcot District. Japanese mist-nets, 3 to 4 feet off the ground, were used among bushes and trees near houses. The birds caught were searched for ticks and other ectoparasites, banded, and released. They were also bled for virological studies. During the course of the study many released birds were recaptured and found to have more ticks. The method adopted for searching for ticks was to lift each feather gently and to remove with a pair of forceps any ticks attached beneath. Special attention was paid to the head region, where the great majority of the ticks were found attached. After one of the authors (R. R.) had

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removed as many ticks as she could find, the bird was searched by a second person, and then handed back to her for a final check. The efficiency of this method is discussed later.

Some birds were also brought in by local trappers from forested areas in North Arcot District. These were the Grey Partridge, *Francolinus pondicerianus* (Gmelin), and the Painted Spurfowl, *Galloperdix lunulata* (Valenciennes). They were kept in the laboratory over trays of water and the engorged ticks collected from time to time as they detached and dropped in the water.

The small mammals were collected mainly from the villages where the birds were captured. They were captured in standard Sherman traps, brought to the laboratory, and transferred to cages which were kept over trays of water for the fed ticks to detach. A few collections were made in Ootacamund, Nilgiri District, and some in Chittoor District, Andhra State.

Results

Birds

Over the period of the study 590 birds belonging to 55 species were examined. Of these, 136 birds belonging to 16 species were found to be positive for Ixodid ticks (Table 1). Only three species of ticks were collected, of which *Haemaphysalis intermedia* Warburton & Nuttal, 1909, was the most common species. Its predominance in the collections is a reflection of the fact that birds were almost all netted in and around villages, since *Haemaphysalis intermedia* is a common cattle tick.

The following species of birds were negative for ticks : *Ardeola grayii* (Sykes) (2), *Accipiter badius* (Gmelin) (5), *Turnix suscitator* (Gmelin) (3), *Streptopelia senegalensis* (Linnaeus) (1), *Psittacula krameri* (Scopoli) (20), *Clamator jacobinus* (Boddaert) (2), *Eudynamys scolopacea* (Linnaeus) (2), *Rhopodytes viridirostris* (Jerdon) (3), *Athene brama* (Temminck) (2), *Caprimulgus asiaticus* Latham (2), *Halcyon smyrnensis* (Linnaeus) (20), *Merops orientalis* Latham (21), *Upupa epops* Linnaeus (10), *Megalaima haemacephala* (P.L.S. Müller) (2), *Dinopium benghalense* (Linnaeus) (16), *Lanius vittatus* Valenciennes (3), *Lanius schach* Linnaeus (1), *Dicrurus adsimilis* (Bechstein) (1), *Dendrocitta vagabunda* (Latham) (1), *Corvus splendens* Vieillot (4), *Corvus macrorhynchos* Wagler (6), *Coracina melanoptera* (Rüppell) (6), *Pericrocotus cinnamomeus* (Linnaeus) (3), *Aegithina tiphia* (Linnaeus) (4), *Pycnonotus luteolus* (Lesson) (4), *Muscicapa latirostris* Raffles (1), *Terpsiphone paradisi* (Linnaeus) (1), *Anthus trivialis* (Linnaeus) (2), *Motacilla maderaspatensis* Gmelin (5), *Nectarinia zeylonica* (Linnaeus) (17), *Nectarinia lotenia* (Linnaeus) (1), *Nectarinia asiatica* (Latham) (4), *Passer domesticus* (Linnaeus) (97), *Petronia xanthocollis* (Burton) (30), *Ploceus philippinus* (Linnaeus) (28),

Lonchura striata (Linnaeus) (1), *Lonchura malacca* (Linnaeus) (19). The number in brackets represents the number of birds examined.

The method of removing ticks has already been described. Its efficacy was tested on a few occasions. Two birds were killed after being searched in the field and five birds were kept alive in the laboratory. Thrice a single tick was collected in the laboratory after the original field examination, and on four occasions no more ticks were recovered. The field method was thus reasonably thorough and it seems likely, therefore, that the majority of the ticks collected on recaptured birds represented fresh infestations, and were not merely ticks which were missed by the naked eye the first time the bird was examined. Indian Pittas and Greyheaded Babblers were frequently recaptured infested with ticks after an interval of a week from the original examination.

Small mammals

The collections made from small mammals in Chittoor and North Arcot Districts are summarised in Table 2. It is interesting to find that many rodents harboured the immature stages of the genus *Hyalomma*, the commonest collected in this study being *H. brevipunctata*. The predominant genus, however, was *Rhipicephalus*, particularly *R. haemaphysaloides*. At present three species of *Rhipicephalus* are recognised in India (Sharif 1928; Dhanda, to be published). These are *Rhipicephalus sanguineus* (Latreille), *Rhipicephalus haemaphysaloides* Supino, and *Rhipicephalus ramachandrai* Dhanda. Two species of *Rhipicephalus* showing distinct differences from the known species were collected during this study from rodents and shrews. These species have been designated as *Rhipicephalus* species 4 and 5 for the present. These species require careful study to determine their taxonomic status. Most of these ticks were collected as fed nymphs and subsequently reared in the laboratory.

A few miscellaneous collections made in North Arcot District have been included in Table 3.

Two *Rattus rattus wroughtoni* and four *Suncus murinus* were collected in Ootacamund, Nilgiri District. Two larvae identified as *Ixodes ceylonensis* were collected, one from *Rattus rattus wroughtoni* and the other from *Suncus murinus*. This is of special interest since it is the first record of this species in India outside the Kyasanur Forest disease area in the forests of Shimoga District, Mysore State.

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TABLE 1

TICKS COLLECTED FROM BIRDS EXAMINED IN NORTH ARCOT DISTRICT FROM JANUARY TO DECEMBER, 1963

Host (Species found negative not included)	Total birds examined	Total birds positive for ticks	*Haemaphysalis intermedia*				*Haemaphysalis bispinosa*	*Hyalomma marginatum isaaci*		Total
			L	N	M	F	L	L	N	
1 *Francolinus pondicerianus* (Gmelin) (Grey Partridge) ..	11	6	19	2	3	1	—	—	—	25
2 *Galloperdix lunulata* (Valenciennes) (Painted Spurfowl) ..	2	2	4	6	—	—	—	—	—	10
3 *Cacomantis merulinus* (Scopoli) (Indian Plaintive Cuckoo) ..	1	1	1	—	—	—	—	—	—	1
4 *Pitta brachyura* (Linnaeus) (Indian Pitta) ..	9	7	57	21	—	—	1	—	—	79
5 *Mirafra assamica* Horsfield (Bush Lark) ..	1	1	6	1	—	—	—	—	—	7
6 *Lanius cristatus* Linnaeus (Brown Shrike) ..	4	1	2	6	—	—	—	—	—	8
7 *Dicrurus leucophaeus* Vieillot (Grey Drongo) ..	4	1	1	—	—	—	—	—	—	1
8 *Sturnus pagodarum* (Gmelin) (Brahminy Myna) ..	35	17	35	8	—	—	—	—	1	44
9 *Acridotheres tristis* (Linnaeus) (Common Myna)	11	5	16	4	—	—	—	1	—	21
10 *Tephrodornis pondicerianus* (Gmelin) (Common Wood Shrike) ..	9	5	10	1	—	—	1	—	—	12
11 *Pycnonotus cafer* (Linnaeus) (Redvented Bulbul)	22	1	2	—	—	—	—	—	—	2
12 *Turdoides affinis* (Jerdon) (Whiteheaded Babbler)	66	57	840	114	—	—	3	1	—	958
13 *Orthotomus sutorius* (Pennant) (Tailor Bird) ..	9	2	2	1	—	—	—	—	—	3
14 *Acrocephalus dumetorum* Blyth (Blyth's Reed Warbler) ..	13	5	11	1	—	—	—	—	—	12
15 *Copsychus saularis* (Linnaeus) (Magpie-Robin) ..	4	3	17	11	—	—	—	—	—	28
16 *Saxicoloides fulicata* (Linnaeus) (Indian Robin) ..	26	22	48	31	—	—	—	—	—	79
Total ..	227	136	1071	207	3	1	5	2	1	1290

NOTE—4 nestling Little Cormorants, *Phalacrocorax niger* (Vieillot), and 9 nestling Grey Herons, *Ardea cinerea* Linnaeus, were examined, and 61 *Argas* larvae were collected from one Little Cormoran t and five Grey Herons.

L = larva ; N = nymph ; M = male ; F = female.

TABLE 2

TICKS ON SMALL MAMMALS FROM CHITTOOR DISTRICT, ANDHRA PRADESH, AND NORTH ARCOT DISTRICT, MADRAS STATE (1962-63)

Host	Total No. examined	No. +ve for ticks	*Hyalomma lomma evipunctata*				*Haemaphysalis intermedia*	*Haemaphysalis leachi* group	*Rhipicephalus haemaphysaloides*			*Rhipicephalus* sp. no. 4	*Rhipicephalus* sp. no. 5			*Hyalomma* sp.?	*Rhipicephalus* sp.?	Total
			L	N	M	F	N	N	N	M	F	N	N	M	F	L	L	
Suncus murinus (Linnaeus) ..	56	7	1	2					1		16		16	2	1		11	50
Vandeleuria oleracea (Bennett)	3	1			4	6												10
Mus platythrix Bennett ..	81	46	13	43	9	17		1	93	2	2					1	13	194
Mus booduga (Gray) ..	4	1				2				1								3
Millardia meltada (Gray) ..	24	15	2	5	1	1			56	5	14						1	85
Tatera indica (Hardwicke) ..	42	9							57	2	2	7	1				10	79
Rattus rattus rufescens (Gray)..	109	17	2	6	5	3			11	11	7		7	5	8		7	72
Rattus rattus wroughtoni Hinton ..	19	9		1					4				5		1			11
Rattus rattus subspecies unknown* ..	3	1	6															6
Rattus blanfordi (Thomas) ..	6	1	1															1
Rattus cutchicus (Wroughton)..	3	2							2								1	3
Bandicota bengalensis (Gray & Hardwicke) ..	4	0																0
Funambulus tristriatus tristriatus (Waterhouse) ..	53	12	1	31	4	10	3		1								1	51
TOTAL ..	407	121	26	88	23	39	3	1	225	21	41	7	29	7	10	1	44	565

* This was a white-bellied form with tail too long for inclusion in *R. r. wroughtoni*. Since all three specimens were immature males, subspecific identification could not be made with certainty.

TABLE 3

MISCELLANEOUS ECTOPARASITIC COLLECTIONS

——	Total No. examined	No. +ve for ticks	*Hyalomma brevipunctata*	*Hyalomma a. anatolicum*	*Haemaphysalis intermedia*				*Haemaphysalis leachi* (Group)		*Rhipicephalus haemaphysaloides*			Total
			F	M	L	N	M	F	M	F	N	M	F	
Canis aureus Linnaeus ..	2	2			13	28	8	17			2		1	69
Herpestes edwardsi (Geoffroy)	2	2							5	1				6
Lepus nigricollis Cuvier ..	1	1			30	27	17	25						99
Domestic pig ..	3	2		3								1		4
Bats ..	5	nil												
Ground drag ..	6	6	1		189	49	2	8			1		1	251
Human ..	2	2									3			3
TOTAL ..	21	15	1	3	232	104	27	50	5	1	6	1	2	432